UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/572,616	10/18/2006	Raoul Florent	FR030105US1	7655

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EXAMINER
BITAR, NANCY

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 December 2009*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

   4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☒ Claim(s) *21* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

   Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

   Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   a)☒ All   b)☐ Some *   c)☐ None of:

      1.☒ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

   * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
   Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
   Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   A request for continued examination under 37 CFR 1.114, including the fee set

forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this

application is eligible for continued examination under 37 CFR 1.114, and the fee set

forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action

has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on

12/10/2009 has been entered.

Response to Arguments

2.   Applicant argues that Zlokolica fail to teach a filter that temporally filters one or

more of the slices for differently filtering the slices according to the content wherein one

or more high frequency slices are filtered at a greater rate than one or more low

frequency slices.

In response, examiner refers to Zlokolica where examiner maintain her argument

that Zlokolica   teaches the image processing system for reduction of the noise and

enhancement of edges in images of a sequence, comprising: a decomposer that

decomposes a spatial image signal yielding slices of different content, the

decomposition being based on pyramidal decomposition (chapter 3, first two

paragraphs); a filter that temporally filters one or more of the slices for differently filtering

the slices according to the content wherein one or more high frequency slices are

filtered at a greater rate than one or more low frequency slices and (chapter 2 and

chapter 3 paragraph 3-9); a recomposer that recomposes the images of the sequence

from at least the temporally filtered slices (chapter 3, last paragraph 3). It is true that

Zlokolica does not explicitly teaches the one or more high frequency slices are filtered at

a greater rate that one or more low frequency slices. However, it is generally knows that

the spatially slowly varying image content (i.e. image background) may be found in the

lower spatial frequency subband whereas the noise is typically found in the higher

spatial frequency subband. Thus, the typical approach in an edge preserving noise

reduction approach is to split the input image signal into a low and high frequency

subband and to filter only the high frequency subband prior to the signal recombination.

Moreover, Zlokolica teaches in section 3 the use of different filter for the lower spatial

frequency subband (equation 7) than the higher frequency sub bands (section 3, page

6). Moreover, Examiner used a secondary reference to show the laplacian pyramid that

contain the high pass fraction and the Gaussian pyramid contains the low pass fraction

therefore, the input signal is split and when the high frequency subband is processed

the lower spatial frequency subband is left intact.

All remaining arguments are reliant on the aforementioned and addressed

arguments and thus are considered to be wholly addressed herein.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 1-3, 5-8, 10-19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Zlokolica ET al (Video denoising using multiple class averaging with

multiresolution, University of Ghent, Belgium) in view of Eck et al (US 2006/0072845)

As to claim 1, Vladimir Zlokolica et al. teaches an image processing system for reduction of the

noise and enhancement of edges in images of a sequence, comprising: a decomposer that

decomposes a spatial image signal yielding slices of different content , the decomposition being

based on pyramidal decomposition(The wavelet transform compresses essential information in an

image into relatively few large coefficients, that correspond to the main image details at different

resolution scales, note that one level in the decomposition have been used for the sake of simplicity

and time cost, page 5, section 3); a filter that temporally filters one or more of the slices for differently

filtering the slices according to the content wherein one or more high frequency slices are filtered at a

greater rate than one or more low frequency slices and (spatio-temporal recursive filter, based on

multiple threshold filtering, see section 2 and section 3 equation (7) and figure 2); a recomposer that

recomposes the images of the sequence from at least the temporally filtered slices (after all four

bands HH,HL,LH and LL have been processed, an inverse wavelet transform is done which produces

the output sequence , page 6, section 3). While Vladimir Zlokolica meets a number of the limitations

of the claimed invention, as pointed out more fully above, Vladimir Zlokolica fails to specifically teach

the differently filtering the slices according to the content wherein one or more high frequency slices

are filtered at a greater rate than one or more low frequency slices. Specifically, Eck et al. teaches the

use of Laplacian pyramid that leads to high frequency wherein The Laplacian pyramid

representations .LAMBDA.sub.j are defined as the difference between the stages input representation

and the copy thereof after passing through the reduction R and expansion E blocks. The "expansion"

E here includes a resolution increase by the factor 2 (by inserting zeros) and a subsequent low-pass

filtering (interpolation). In this case, 3.times.3 binomial filters are used for the low-pass filtering

operations in the reduction R and the expansion E. The Laplacian pyramid representations

.LAMBDA.sub.j accordingly contain the high-pass fraction and the Gaussian pyramid representations

.GAMMA...sub.j contain the associated low-pass fraction of the resolution stage j (paragraph[0013]

and [0045-0047]; figure 1 and 6).It would have been obvious to one of ordinary skill in the art to use

different filtering in Vladimir Zlokolica filtering process in order to reduce the noise in an input image I

while at the same time maintaining the image details and the image sharpness. Therefore, the

claimed invention would have been obvious to one of ordinary skill in the art at the time of the

invention by applicant.

As to claim 2, Eck et al., teaches the system of claim 1 pyramidal decomposition

is one of laplacian or Gaussian (The resolution of an input image into a Laplacian

pyramid or Gaussian pyramid is frequently used in medical image processing and is

particularly suitable for use on image strips, paragraph [0014])

As to claim 3, 13, and 18, Eck et al. teaches the system of claim 1 wherein the

temporal filtering comprises adaptive filtering (in this method, which is referred to as

MRGAF (Multi-Resolution Gradient Adaptive Filtering), paragraph [0004]).

As to claim 5, Vladimir Zlokolica et al. teach the system of claim 1 wherein the

temporal filtering comprises recursive adaptive filtering (A time recursive spatio-

temporal filter has been presented in this paper, see section 2 and section 5).

As to claim 6, 14, and 19, Vladimir Zlokolica et al. teaches the system of claim 1, further comprising a display device for displaying the images of the sequence (video sequence, see section 1-2).

Claim 7 differ from claim 1 only in that claim 1 is a system claim whereas; claim 7 is a computer claim. Thus, claim 7 is analyzed as previously discussed with respect to claim 1 above.

Claim 8 differ from claim 1 only in that claim 1 is a system claim whereas; claim 8 is a method claim. Thus, claim 8 is analyzed as previously discussed with respect to claim 1 above.

As to claim 10, and 15, Vladimir Zlokolica et al., teaches applying laplacian pyramid decomposition to perform the decomposition of the spatial image signal (section 3, page 5; see also Eck et al figure 5)

As to claim 11 and 16, Vladimir Zlokolica teaches applying Gaussian pyramid decomposition to perform the decomposition of the spatial image signal (wavelet decomposition, page 6, figure 2,see also Eck et al paragraph [0044-0047]))

As to claims 12 and 17, Vladimir Zlokolica et al. teaches applying adaptive temporal recursive filtering to perform the temporal filtering of at least a portion of the slices (adaptive filtering, 800, column 17, lines 45, column `18, lines 1-40; see also Eck et al figure 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5.   Claims 4, 9 and 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zlokolica in view of Eck et al and further in view of Brailean et al(Noise Reduction: Filters for Dynamic Image sequence: A Review) .

While Zlokolica and Eck et al. meets a number of the limitations of the claimed invention, as pointed out more fully above, Zlokolica fails to specifically teach the temporal filtering comprises motion compensation. Specifically, Brailean et al. teaches the motion compensated spatiotemporal filtering where the addition of motion compensation to a non motion compensated filter does result in a new filter which helps the temporal correlation

(Page 1278-1281). It would have been obvious to one of ordinary skill in the art to include the motion compensation of Brailean in Zlokolica temporal filtering in order to allow for the support of the filter to be increased in the temporal direction improving the filter's ability to suppress noise without incurring additional artifacts due to motion(see section B: Motion Compensated Spatiotemporal). Therefore, the claimed invention would have been obvious to one of ordinary skill in the art at the time of the invention by applicant.

Allowable Subject Matter

6.   Claim 21 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NANCY BITAR whose telephone number is (571)270-1041. The examiner can normally be reached on Mon-Fri (7:30a.m. to 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nancy Bitar/
Examiner, Art Unit 2624

/WESLEY TUCKER/
Primary Examiner, Art Unit 2624